

Date: Thu, 29 Apr 93 14:08:56 PDT  
From: Info-Hams Mailing List and Newsgroup <info-hams@ucsd.edu>  
Errors-To: Info-Hams-Errors@UCSD.Edu  
Reply-To: Info-Hams@UCSD.Edu  
Precedence: Bulk  
Subject: Info-Hams Digest V93 #517  
To: Info-Hams

Info-Hams Digest                      Thu, 29 Apr 93                      Volume 93 : Issue    517

Today's Topics:

    Current handling capacity and Jones connectors... (2 msgs)  
        Differential equations and power.  
            DSP Noise Filter  
    FCC Rules on Transmission (2 msgs)  
        GE Master Exec IIs or IIs wanted  
        Helical filters for HT's  
    Info-Hams Digest V93 #513  
        Leads on Project-Pro?  
        Possible to parallel x-formers??  
    Standard 12 VDC Connectors (2 msgs)  
        STS-55 Element Set GSFC-009  
        Thanks net & intermod question  
    Yaesu FT-5100 CAT/Remote Control Mike Interface

Send Replies or notes for publication to: <Info-Hams@UCSD.Edu>  
Send subscription requests to: <Info-Hams-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Info-Hams Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/info-hams".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

-----

Date: 29 Apr 93 15:09:52 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: Current handling capacity and Jones connectors...  
To: info-hams@ucsd.edu

The Amateur Radio Emergency Service (ARES) has standardized on a 2-pin  
8-amp (maybe 12 amp) DC connector sold by Radio Shack (made by Molex). At  
least, my understanding is that the ARRL has recommended that ARES do so.

The Radio Shack part number is 274-222. By ARRL / ARES convention, the

pointed side of the nylon body is positive. You put the female pins in the male body and vice-versa. Use male bodies on power sources and female bodies on radios, since the pins in un-plugged female bodies could accidentally be shorted together. (humor shields, UP!)

The current RS catalog lists them as having 12 amps capacity, but I believe older catalogs said 8 amps, so evidently they now consider a higher operating temperature to be acceptable.

Advantages:

- \*readily available
- \*only 99 cents/pair
- \*easy to solder
- \*polarity protected if wired correctly
- \*standard supported by a major organization
- \*can be either panel mounted or end of wire
- \*similar (non-interchangeable) connector for 20 amps available (RS 274-151,154)

Disadvantages:

- \*connectors do not lock together
- \*only 8 or 12 amps capacity
- \*require soldering
- \*special tool required to extract pins from body if you ever needed to
- \*rectangular hole required for panel mounting
- \*non hermaphroditic

Observation - Some people get surprisingly upset over the question of standard connectors.

Final words of wisdom - "I believe in standards. That's why I have one of every one of them."

```
= = = = =
_      Miles Abernathy, N5K0B      =
| |__ miles@emx.cc.utexas.edu      =
_|    | POB 7580, Austin TX 78713  =
\  *  / University of Texas @ Austin =
  \ /   tel. (512) 471-6521         =
= = = = =
```

-----

Date: Thu, 29 Apr 1993 17:09:22 GMT  
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!gatech!  
mailer.cc.fsu.edu!geomag!zateslo@network.UCSD.EDU  
Subject: Current handling capacity and Jones connectors...  
To: info-hams@ucsd.edu

In article <123855@netnews.upenn.edu> yee@mipg.upenn.edu (Conway Yee) writes:

> [...]

>

>I am interested in standardizing all my 12V equipment to a single plug. I  
>am considering using a 2 pin Jones connector for this purpose. Can I expect  
>problems drawing up to 20 amps on it? Is it's current rating sufficiently  
>conservative to do this?

>

>Perhaps it is a mistake to standardize on a 2 pin Jones. Would a 4 pin Jones  
>(where I use 2 pins for positive and 2 for negative) be better? Are there  
>more appropriate connectors to use?

A long time ago, hams here around Tallahassee standardized on the  
2-pin Jones connector for 12v connections. Aside from the ease with  
which these things can be pulled apart, they work pretty well. I  
have seen them used on a 130W FM amplifier, without appreciable  
heating. The big limiting factor is that you can't easily stuff  
big wire into the connector shell (#12 is about the limit). For  
low-power stuff (<50W) they're fine.

The most important thing, though, is to get together with the other  
hams in your area and standardize on something that you will all use.  
It's a great boon to be able to power up your gear in someone else's  
car or shack in 5 seconds. If your pals are using the Molex 2-pin,  
or Jones plugs, or some oddball thing, use it too, or at least  
make some adapters so you're ready.

Ted Zateslo, W1X0  
zateslo@geomag.gly.fsu.edu

-----

Date: Thu, 29 Apr 1993 19:51:15 GMT  
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!  
zaphod.mps.ohio-state.edu!sdd.hp.com!hpscit.sc.hp.com!news.dtc.hp.com!srngenprp!  
alanb@network.UCSD.EDU  
Subject: Differential equations and power.  
To: info-hams@ucsd.edu

William J. Bencze (bencze@isl.stanford.edu) wrote:

: >> On 28 Apr 93 16:32:20 CDT, dadams@cray.com (David Adams) said:

: > Durring the disscussion of how current leads voltage in an inductor  
: > by a phase angle of 90deg, It is apparent that there are a few  
: > differential equations lying just below the surface here, that might  
: > help explain the subject to a mathophile like my self. Have any of  
: > you ever seen the subject presented that way? Does it lead to  
: > a mathimatical explanation of how phase angles are calculated?

:  $i = C \, dv/dt$       and       $v = L \, di/dt$     (ref: physics/EE/ARRL Handbook)

..

: Therefore, in a capacitor, current leads voltage, while in an inductor,  
: voltage leads current.

A useful mnemonic is

ELI the ICE man

i.e. Voltage (E) leads current (I) in an inductor (L)  
     Current (I) leads voltage (E) in a capacitor (C)

AL N1AL

-----

Date: 29 Apr 93 18:30:19 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: DSP Noise Filter  
To: info-hams@ucsd.edu

Does anyone have any first hand information about the DSP Noise Filter made by Timewave Tech? For the price (\$149) it looks like something I could use. I have a TS-820 without the CW filter. With the cost of filters being what they are, the DSP looks like a viable alternative. I am also interested in cutting down on the heterodynes caused by the tuner-uppers on SSB.

I would prefer to buy after being able to evaluate the performance, but that is not feasible in this case. Any reports would be appreciated.

TNX ES 73  
Rick  
KB5VDT

Rick\_A.\_Martin.Oklahoma\_City@Xerox.COM

-----

Date: 29 Apr 93 12:58:16  
From: idacrd.ccr-p.ida.org!idacrd!n4hy@uunet.uu.net  
Subject: FCC Rules on Transmission  
To: info-hams@ucsd.edu

>A ham buddy of mine told me that if operating on simplex as  
>long as you are transmitting under 1W that anyone, licensed or not,  
>can talk on these frequencies and even if you are licensed, do not

>have to identify.

I missed the original post and you did not include sufficient information for me (and I can only assume others) to determine what it is you are talking about!

BMc

--

-----  
Robert W. McGwier | n4hy@ccr-p.ida.org  
Center for Communications Research | Interests: amateur radio, astronomy, golf  
Princeton, N.J. 08520 | Asst Scoutmaster Troop 5700, Hightstown  
-----

Date: 29 Apr 93 17:45:58 GMT  
From: mvb.saic.com!unogate!news.service.uci.edu!usc!zaphod.mps.ohio-state.edu!  
moe.ksu.ksu.edu!cis.ksu.edu!mac@network.UCSD.EDU  
Subject: FCC Rules on Transmission  
To: info-hams@ucsd.edu

n4hy@harder.ccr-p.ida.org (Bob McGwier) writes:

>>A ham buddy of mine told me that if operating on simplex as  
>>long as you are transmitting under 1W that anyone, licensed or not,  
>>can talk on these frequencies and even if you are licensed, do not  
>>have to identify.

The rules vary by frequency, and I don't recall that any of them are related to mode (AM/FM/simplex/duplex,etc.)

The power limitation you mentioned is true for the "lofer" band, but there are OTHER rules you did not mention (e.g., maximum length of antenna must be less than 50 feet; which is roughly equivalent to one INCH on ten meters!). I don't remember the band limits exactly, but about 175-190 KHz tickles my memory.

In the "cb" and "broadcast" (both AM and FM) bands, I recall the power limitation is 100 MILLIwatts (one-tenth of a watt); there may be other rules, too, but I'm NOT a lawyer, so....

--Myron.

--

# We preserve our freedoms using four boxes: soap, ballot, jury, and cartridge.  
# Myron A. Calhoun, PhD EE; Assoc. Professor (913) 539-4448 home  
# INTERNET: mac@cis.ksu.edu (129.130.10.5) 532-6350 work, 532-7353 fax  
# UUCP: ...rutgers!depot!mac Packet-BBS: WOPBV @ KOVAY.#NEKS.KS.USA.NAOM  
-----

Date: Thu, 29 Apr 1993 18:01:00 GMT  
From: hal.com!olivea!pagesat!spssig.spss.com!feenix.metronet.com!  
marchbg@decwrl.dec.com  
Subject: GE Master Exec IIs or IIs wanted  
To: info-hams@ucsd.edu

I'm looking for GE Master Exec IIs or GE Master IIs, UHF models (77 or 88, preferably 77s). Reply via E-mail! 73 and tnx.

Marc Grant	Internet: marcbg@feenix.metronet.com
POB 850472	Amateur Radio Station N5MEI
Richardson, TX 75085	Voice/Fax: 214-231-3998

Date: Thu, 29 Apr 1993 19:46:24 GMT  
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!  
zaphod.mps.ohio-state.edu!sdd.hp.com!hpscit.sc.hp.com!news.dtc.hp.com!srigenprp!  
alanb@network.UCSD.EDU  
Subject: Helical filters for HT's  
To: info-hams@ucsd.edu

RICK\_A.\_MARTIN.OKLAHOMA\_CITY@xerox.COM (RICK\_A.\_MARTIN.OKLAHOMA\_CITY@xerox.COM)  
wrote:

```
: >Does anyone have any advice or recommendations about filters/amps/etc
: >that would improve the selectivity of my HT?
```

```
: David:
: The Ramsey 2 meter power amp has a note in it that says you can put a helical
: filter in the receive preamp circuit.  They reference Digi-Key as a source for
: the TOKO helical filters.  (about $25)  According to their notes, you need to
: have a TR switch because you DO NOT want to transmit through a helical filter.
```

I bet you could transmit a 2-watt HT through the helical resonator. Of course, you might not want to bet \$25 on it!

AL N1AL

Date: 29 Apr 93 18:56:48 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: Info-Hams Digest V93 #513  
To: info-hams@ucsd.edu

 $\succ$

> Date: Wed, 28 Apr 1993 18:55:39 GMT  
> From: mvb.saic.com!unogate!news.service.uci.edu!usc!sdd.hp.com!hpscit.sc.hp.com!  
icon.rose.hp.com!lkraft@network.UCSD.EDU  
> Subject: Another AM Question  
> To: info-hams@ucsd.edu  
>  
> Hello gang,  
>  
> A colleague and I were pondering this scenario:  
>  
> Suppose you generate a single carrier signal with no modulation, and  
> feed this up to your x-element beam. So far, you are radiating a  
> signal that has zero bandwidth in some fixed direction. OK, now  
> say you rotate your antenna at a rate of, say, 1000 revolutions per  
> second. To a distant observer, will this signal now appear to have  
> sidebands spaced 1 KHz away from the carrier since he now only sees  
> a carrier that "bursts" at a 1KHz rate? Remember, we are still only  
> generating a single, unmodulated carrier. Are the "sidebands" a  
> figment of the receiver?  
>

In the field of air navigation this is referred to as space modulation.  
It is used in both VOR ( Vhf Omni Range ) and TACAN ( TACTical Air  
Navigation ). The VOR Stations use a system of combining two sideband  
signals with a carrier, The phasing of these signals is changed to give  
the illusion that the antenna is rotating without physically rotating the  
antenna. As I recall ( It been about ten years since I worked on these things)  
The Pattern is rotated at a 60 Hz rate and appears to an aircraft to be an  
AM signal modulated with a 60 Hz tone. Then the carrier is modulated with a  
9960Hz tone that is FM'ed at a 60 Hz rate. When the Aircraft receive the  
signal it demodulates both and the phase relationship of the two signals  
indicates where the aircraft is in relation to the station. TACAN works basically  
the same but the antenna is actually rotated and the space modulation has more  
than one tone on it.

73

Clay

KB2FUR

Clayton DeCosterd

INTERNET : clay @ drone.hazeltine.com

COMPUSERVE: 71754,447

-----  
Date: Thu, 29 Apr 1993 18:36:24 GMT

From: ucsnews!sol.ctr.columbia.edu!zaphod.mps.ohio-state.edu!magnus.acs.ohio-  
state.edu!rlong@network.UCSD.EDU

Subject: Leads on Project-Pro?

To: info-hams@ucsd.edu

I have been buying cabinets from a company called  
Project Pro of Twinsburg, OH.

They seem to have gone bankrupt - phones disconnected.  
They used to advertise in some of the ham magazines but  
understand that in at least one case they have left an  
unpaid bill.

Question. Does anyone know if someone else has taken over  
the company? Has a liquidator purchased the inventory?  
Any leads appreciated.

Ron Long  
w8gus@amsat.org

-----  
Date: 29 Apr 1993 18:49:37 GMT  
From: agate!darkstar.UCSC.EDU!cats.ucsc.edu!haynes@ames.arpa  
Subject: Possible to parallel x-formers??  
To: info-hams@ucsd.edu

In article <1993Apr29.150423.3722@exu.ericsson.se> exualan@exu.ericsson.se writes:  
>Speculating now -  
>Is it reasonable to assume that the internal resistance of the secondary  
>wire will at least limit the current of any single transformer of the bunch  
>to within its design limits?

Not unless the transformer is designed not to catch fire with its  
secondary shorted.

--  
haynes@cats.ucsc.edu  
haynes@cats.bitnet

"Ya can talk all ya wanna, but it's dif'rent than it was!"  
"No it aint! But ya gotta know the territory!"  
Meredith Willson: "The Music Man"

-----  
Date: 29 Apr 93 15:18:07 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: Standard 12 VDC Connectors  
To: info-hams@ucsd.edu

The Amateur Radio Emergency Service (ARES) has standardized on a 2-pin  
8-amp (maybe 12 amp) DC connector sold by Radio Shack (made by Molex). At



least, my understanding is that the ARRL has recommended that ARES do so.

The Radio Shack part number is 274-222. By ARRL / ARES convention, the pointed side of the nylon body is positive. You put the female pins in the male body and vice-versa. Use male bodies on power sources and female bodies on radios, since the pins in un-plugged female bodies could accidentally be shorted together. (humor shields, UP!)

The current RS catalog lists them as having 12 amps capacity, but I believe older catalogs said 8 amps, so evidently they now consider a higher operating temperature to be acceptable.

Advantages:

- \*readily available
- \*only 99 cents/pair
- \*easy to solder
- \*polarity protected if wired correctly
- \*standard supported by a major organization
- \*can be either panel mounted or end of wire
- \*similar (non-interchangeable) connector for 20 amps available (RS 274-151,154)

Disadvantages:

- \*connectors do not lock together
- \*only 8 or 12 amps capacity
- \*require soldering
- \*special tool required to extract pins from body if you ever needed to
- \*rectangular hole required for panel mounting
- \*non hermaphroditic

Observation - Some people get surprisingly upset over the question of standard connectors.

Final words of wisdom - "I believe in standards. That's why I have one of every one of them."

```
= = = = =
-      Miles Abernathy, N5K0B      =
| |__ miles@emx.cc.utexas.edu      =
_|   | POB 7580, Austin TX 78713   =
\  * / University of Texas @ Austin =
  \ /   tel. (512) 471-6521         =
= = = = =
```

-----

Date: Thu, 29 Apr 93 17:45:57 GMT  
From: pacbell.com!att-out!walter!porthos!dancer!whs70@network.UCSD.EDU  
Subject: Standard 12 VDC Connectors  
To: info-hams@ucsd.edu

In article <9304291518.AA23622@emx.cc.utexas.edu> miles@emx.cc.utexas.edu (Miles Abernathy) writes:

>The Amateur Radio Emergency Service (ARES) has standardized on a 2-pin  
>8-amp (maybe 12 amp) DC connector sold by Radio Shack (made by Molex). At  
>least, my understanding is that the ARRL has recommended that ARES do so.  
>

>The Radio Shack part number is 274-222. By ARRL / ARES convention, the  
>pointed side of the nylon body is positive. You put the female pins in the  
>male body and vice-versa. Use male bodies on power sources and female  
>bodies on radios, since the pins in un-plugged female bodies could  
>accidentally be shorted together. (humor shields, UP!)

>  
>The current RS catalog lists them as having 12 amps capacity, but I believe  
>older catalogs said 8 amps, so evidently they now consider a higher  
>operating temperature to be acceptable.

Advantages/disadvantages deleted for brevity

>Observation - Some people get surprisingly upset over the question of  
>standard connectors.

>  
>Final words of wisdom - "I believe in standards. That's why I have one of  
>every one of them."

I agree, and without commenting on whether this choice is good/bad, etc.  
it would be great (IMHO) if the manufacturers then used the "standard"  
connector on their equipment instead of having a different one used by  
each manufacturer.

Standard Disclaimer- Any opinions, etc. are mine and NOT my employer's.

-----  
Bill Sohl (K2UNK) BELLCORE (Bell Communications Research, Inc.)  
Morristown, NJ                      email via UUCP              bcr!cc!whs70  
201-829-2879 Weekdays              email via Internet      whs70@cc.bellcore.com

-----  
Date: 29 Apr 93 16:31:21 GMT  
From: news-mail-gateway@ucsd.edu  
Subject: STS-55 Element Set GSFC-009  
To: info-hams@ucsd.edu

SB SAREX @ AMSAT \$STS-55.010  
STS-55 Element Set GSFC-009

The following represents the latest Keplerian element set for the STS-55

space shuttle mission as generated by Ron Parise, WA4SIR, at the Goddard Space Flight Center

STS-55

```
1 22640U 93 27 A 93119.30346888 0.00041555 00000-0 12437-3 0 90
2 22640 28.4657 248.9700 0008507 261.6404 98.3243 15.90737307 440
```

Satellite: STS-55

Catalog number: 22640

Epoch time: 93119.30346888 (29 APR 93 07:16:59.71 UTC)

Element set: GSFC-009

Inclination: 28.4657 deg

RA of node: 248.9700 deg Space Shuttle Flight STS-55

Eccentricity: 0.0008507 Keplerian Elements

Arg of perigee: 261.6404 deg

Mean anomaly: 98.3243 deg

Mean motion: 15.90737307 rev/day Semi-major Axis: 6678.3507 Km

Decay rate: 0.42E-03 rev/day\*2 Apogee Alt: 305.64 Km

Epoch rev: 44 Perigee Alt: 294.28 Km

NOTE - This element set is based on NORAD element set # 009.  
The spacecraft has been propagated to the next ascending node, and the orbit number has been adjusted to bring it into agreement with the NASA numbering convention.

Submitted by Frank H. Bauer, KA3HDO for the SAREX Working Group

/EX

-----  
Date: 29 Apr 93 12:18:22 GMT  
From: pacbell.com!iggy.GW.Vitalink.COM!wetware!spunky.RedBrick.COM!psinntp!  
psinntp!gdc!kurdzo@network.UCSD.EDU  
Subject: Thanks net & intermod question  
To: info-hams@ucsd.edu

Craig Bosworth (craigb@sdd.hp.com) wrote:

```
> bad intermod performance with their dualband HT's?
>
> The guy at Oklahoma Communications Center claims that the TH78 has
> worse intermod problems than other HTs. A guy I talked to at HRO says
> that they all have problems and are about the same.
>
> Does anyone have any experience to back up either of these views?
>
```

>  
>  
> Thanks!  
> --  
> Craig Bosworth (619) 592-8609  
> Hewlett-Packard, San Diego Division  
> craigb@sdd.hp.com

I \_used to\_ own an Alinco DJ-580. When used in my car with a 1/4 wave mag mount, the intermod (front end overload, actually) was so bad that the radio was virtually unusable. After returning it to Alinco (twice) I finally gave up and traded it in for a mobile rig. I also own an Alinco DJ-F1T --- great radio, built like a tank, no intermod!

--

Jim Kurdzo N1KKA  
General DataComm  
Middlebury, CT 06762-1299  
(203) 574-1118 x6443  
kurdzo@gdc.com

-----  
Date: Thu, 29 Apr 1993 18:32:33 GMT  
From: csus.edu!csulb.edu!byon@decwrl.dec.com  
Subject: Yaesu FT-5100 CAT/Remote Control Mike Interface  
To: info-hams@ucsd.edu

I own a FT-5100 and became interested in the Remote Control Mike, not for its wirelessness, but because it can control most of the radio's features via a serial data stream through the microphone jack. Although I do not own the wireless mike, I was able to build an interface between my PC and my 5100. It is somewhat similar to the CAT interface I have built for my FT-757 HF rig, but mostly like the interface described in the FT-912R manual (loaned to me via a friend from Yaesu). I have recently been working on a micro-controller based radio controller which I use for transmitter hunts, and other ham related activities, and I plan to allow it to control my 5100 soon, but so far I have only controlled the radio from my PC. When using my PC as the source for the serial data, I used a MAX232 chip for a level conversion between the +/- 12 volts levels on the computer and the 0-5 volt levels on the radio.

The serial data parameters are 4800 N82. The commands sent to the radio are simple one byte instructions. The RMC mode ON command (16) must be sent before any other command. When the RMC mode is ON, a

small LCD "RMC" icon will light on the display (see owners manual under Display). Also, the Vol, Sql, and Bal knobs are disabled when in the RMC mode because they will be controlled via serial commands, but all other buttons are still active.

The commands are as follows:

0 - RPT	12 - CALL	24 - SQL Up
2 - REV	14 - BAND	26 - VOL Up
4 - MHZ	16 - RMC	28 - BAL Right
6 - D/MR	18 - SUB	30 - BAL Left
8 - TONE	20 - PAGE	32 - SQL Down
10 - LOW	22 - F/W	33 - VOL Down

The interface I built simply wired mike port pin 7 to serial ground and pins 1 and 3 each through a diode then together, to the serial source. Note: I am not a hardware person! Use this hardware at your own risk.

```
+----1 7----- GND
|   2 8 6
| +--3 5  +--+----- SER IN   (These can be connected to a MAX232
| |   4   | |               or the FIF-232C pins 1 and 3)
| +--->|---+ |
+----->|-----+
```

You can wire 1 and 3 together first, then through 1 diode, but that disables the UP and DOWN buttons.

I will continue to study this more. If anyone would like to know more, or has any corrections or feedback, please email me.

73 Byon

-----  
Byon Garrabrant                      KD6BCH                      byon@csulb.edu  
-----

--  
Byon Garrabrant   KD6BCH   byon@csulb.edu  
  
-----

Date: 29 Apr 1993 19:32:46 GMT  
From: saimiri.primate.wisc.edu!news.larc.nasa.gov!grissom.larc.nasa.gov!  
kludge@ames.arpa  
To: info-hams@ucsd.edu

References <1rnnsnINNd59@darkstar.UCSC.EDU>,  
<1993Apr29.150423.3722@exu.ericsson.se>, <1rp801INNq26@darkstar.UCSC.EDU>(  
Subject : Re: Possible to parallel x-formers??

In article <1rp801INNq26@darkstar.UCSC.EDU> haynes@cats.ucsc.edu (Jim Haynes)  
writes:

>

>In article <1993Apr29.150423.3722@exu.ericsson.se> exualan@exu.ericsson.se  
writes:

>>Speculating now -

>>Is it reasonable to assume that the internal resistance of the secondary  
>>wire will at least limit the current of any single transformer of the bunch  
>>to within its design limits?

>

>Not unless the transformer is designed not to catch fire with its  
>secondary shorted.

Incidentally, this is the case with transformers intended for arcwelding  
service. Need a whole lot of 24V to run those filaments?

--scott

-----

End of Info-Hams Digest V93 #517

\*\*\*\*\*